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AUTHOR Sager, Harvey; Konomos, Philip
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ABSTRACT

The first of two parts of this paper, "From Computer Literacy to Technological Literacy: The Challenge for Faculty Development," traces some of the problems and solutions associated with faculty development issues surrounding computers and telecommunications technologies. It is argued that although the need for technological literacy among higher education faculty is recognized, successful faculty development programs using computer technology such as computer assisted instruction, word processing, database management, and other computer software, are often not implemented. This part contains 16 annotated references. The second part, "ALTEC: Implementing an Advanced Learning Technologies Laboratory for Faculty at Arizona State University," describes a solution to the need for faculty development programs at Arizona State University, i.e., the development of ALTEC (Advanced Learning Technologies Education Center) to meet the faculty's need for hands-on exposure to and experience with state-of-the-art educational technology. It is noted that the ALTEC laboratory provides a place where faculty members can become familiar with advanced instructional technologies, including laser discs, 8mm video, VHS Hi Fi, communications satellites, and multi-image systems. (DB)

ALTEC (ADVANCED LEARNING TECHNOLOGIES CENTER):

PROMOTING FACULTY USE OF INSTRUCTIONAL TECHNOLOGY AT ARIZONA STATE UNIVERSITY

by

Harvey Sager, Reference Librarian,
Arizona State University
and
Philip Konomos, Media Specialist,
Arizona state university

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PART I

From Computer Literacy to Technological Literacy:

The Challenge for Faculty Development

The steady infusion of computers and related educational technologies into colleges and universities have placed increasing pressures on faculty development programs at every level of the higher education system. Efforts to incorporate the new technologies into the mainstream of higher education have not kept pace with rapid new developments in microcomputing, optical information storage, networks, and telecommunications. The rapid changes in these technologies impact the educational environment and present significant challenges to university administrators, faculty, and librarians, as they try to stay current and competent in utilizing these technologies to improve teaching and research. Although new educational technologies hold great promise for creating improved learning environments, they clearly demand the acquisition of new skills and knowledge on the part of faculty members who will use them. The first part of this paper traces some of the problems and solutions associated with faculty development issues surrounding computers and telecommunication technologies; the second part describes what I believe is a unique response to these issues at Arizona State University-- ALTEC, an Advanced Learning

Technologies Education Center, developed to meet a diversified faculty's need for hands on exposure to and experience with state-of-the art educational technology.

A review of the literature on faculty development, with respect to the issue of computer literacy, reveals that recognition of the computer's utility as a teaching tool significantly preceded both its arge scale infusion into the university teaching environment, and recognition on the part of university administrators that all faculty, not just those in Engineering and Mathematics, must have the opportunity and means to learn about new teaching and information technologies.

The term "computer assisted instruction" was used as a descriptor in the ERIC database as early as 1966 , according to the Thesaurus of ERIC Descriptors (11th. edition, 1987). With perfect hindsight we can see that early articles on this topic were a portent of the potential computers held as teaching/learning tools. By 1980, the term "computer literacy" had not only found its way into educators' jargon, but was listed as a subject heading in another standard indexing source, H. W. Wilson's Education Index (Cumulative index, July , 1980-June, 1981, p. 246).

In 1982, the ERIC Thesaurus also picked up this terminology, and "computer literacy" was permanently stamped in the educational lexicon. Although the debate over the exact meaning of the term can be traced through the literature, the scope note in the

Thesaurus defines this term as an "awareness of or knowledge about computers, their capabilities, applications, and limitations, (which) may include the ability to interact with computers to solve problems" (Thesaurus of ERIC Discriptors, 11th Edition, p. 45). This definition is interesting in several respects. Today, with the proliferation of microcomputers in the classroom, office, and home, I think most would concede that an "awareness" of computers' capabilities alone would not constitute "literacy"; certainly, "knowledge about computer capabilities and applications" would today be a minimum requirement for computer literacy. It might be argued, in fact, that any current definition of computer literacy must "include the ability to interact with computers to solve problems". Furthermore, the Thesaurus caveat about computer "limitations" in retrospect seems a needless concession to those educators who viewed the computer's relentless advance as a threat to their livelihood (Needham, 1986). Today, few are so computer literate or technologically competent that they would profess to know the limitations of the educational applications of computers.

It is interesting to note that by 1986 a new computer term was added to the Thesaurus: "Computer Uses in Education"... without a caveat or disclaimer (Theasaurus of ERIC Descriptors, 11 Edition, p. 45)!

With the advent of the microcomputer, the computer had come out from behind the closed doors of laboratories and university computing centers, and this genie could not be returned to the bottle. Between 1983 and 1989 nearly 400 articles can be found in ERIC indexed under the new educational battle cry for "computer literacy"; not surprisingly, many of these articles specifically addressed the need for university faculty to become computer literate. After all, how could university faculties prepare students for careers-- and for citizenship-- in the emerging information age without firsthand knowledge of the new information technologies.

It was becoming clear that rapid advances in computer and telecommunications technology would have profound social, economic, and political impact. How well the nation's educational system prepared students for the challenges and changing roles that lay ahead even became a national obsession, culminating in a Congressional report, a Nation at Risk, (U.S. Department of Education, 1984). With the frontiers of knowledge expanding at such a rapid rate, how could students be best prepared to succeed in careers that today may not even exist; and what new skills and tools would teachers need to prepare their students for the certainty of change?

John Scully, founder of Apple Computers, was recently quoted in an educational journal, as saying, "What tomorrow's students will need is not mastery of subject matter, but mastery of

learning" (Tally, 1989, p. 28). Scully's prediction strikes at the heart of the computer literacy issue; for the computer, coupled with telecommunications and optical storage technology, holds the promise of providing teachers with a powerful tool to create rich, individualized, learning environments (Tally, 1989); the kind of learning environment which will be independent of geographical location and time, and which ultimately will provide opportunities for lifelong learning. Gooler (1989, p.19) supports the prediction that "information technology systems, with computers at their core, but with video, telecommunications and other technology components integrated as vital aspects of these systems, (will) represent the next generation of technologies with the potential as instructional media." He further points out that if future teachers are to be effectively trained in utilizing these new technologies, then university faculty members must "understand, use, and be able to teach about technology applications" (Gooler, 1989, p.20). There seems to be general consensus in the educational literature regarding the necessity to give teachers-in-training the necessary skills to navigate the constantly changing world of educational technology. It is not surprising, therefore, that College of Education faculty have been at the forefront of educational technology advocacy. However, the need for technological literacy (a term which has been appearing in education literature with increasing frequency since 1986) among higher education faculty in general, has gained

increasing recognition by administrators of colleges and universities nationwide. Recently, a whole issue of the journal Educational Technology (29:3, 1989) was devoted to this topic.

In spite of the fact that the necessity and desire for faculty development programs in educational technology is widely acknowledged, the implementation of successful model programs has been less evident, though not absent. Several university-wide programs targeting faculty development in the areas of computer and technological literacy, e.g., the programs at Tennessee State University (Cole, 1987), Drexel (Smith & Allan, 1983), and State University of New York (Peal, 1984) have gained national attention through reports in the educational research literature. Most have met with varying degrees of success, and the literature on faculty resistance, acceptance, and indifference regarding the infusion of computers and computer training for university faculty ias abundant. Department-oriented computer literacy programs in the areas of education, engineering, mathematics, foreign language instruction, and writing/ composition (those areas where educational software applications are more commonly in use at the university level) have been reported in the literature (Pusack, 1986; Bump, 1987; Haley & Farland, 1989).

Lieblum (1989) argues for a centralized approach to exposing faculty to and training faculty in the new computer technologies, citing the efficiency of centralizing human and computer resources and the benefits of regularly scheduled workshops, seminars,

demonstrations, and consultations that such a program can offer. Others make an equally strong case for faculty development opportunities at the departmental level (Bitter & Rossberg, 1988), citing peer support and common subject interests as motivational factors to learn the new technologies. Combinations of the two models are also found in the literature, with computer training most commonly offered by the university's computer center in the form of workshops and seminars on DOS, E-Mail, word processing, database management and, more recently, desktop publishing and graphics software. University librarians have also been visible in promoting new technologies and training faculty in their use (Piele, 1988), most commonly offering faculty training in computerized information retrieval.

Whichever training is used, research on faculty motivation and attitudes regarding technological literacy training points to the conclusion that there are four possible contexts in which computer technology will be perceived useful (Wedman & Strathe,1985): 1) as an instructional tool; 2) as a creative tool, i.e., used in the creative process and as an object of study leading to publication and/or consultation; 3) as a management tool, such as information processing, etc.; and 4) as a personal tool, used outside professional responsibilities, e.g., recreation/hobby use. Unless a clear identification with at least one of these four perceived motivational factors is present, it is unlikely that faculty members will seek, participate in, or benefit by computer literacy training.

It is logical to conclude that it must be the primary mission of any computer/technological literacy program to match these perceived "contexts" of usefulness with appropriate instructional programs, regardless of the level at which the program is implemented: individual, group, departmental, school, or college/university. If faculty are to become technologically literate, universities must create tangible opportunities for faculty to utilize the latest educational technologies, and create opportunities for faculty to integrate these technologies into the curriculum (Anadam, & Kelly 1982).

At Arizona State University, we are fortunate to have a variety of programs, at various organizational levels, which provide faculty with opportunities for developing computer literacy skills. A microcomputer infusion project was begun in the early 1980s on a university-wide basis, with the goal of expanding faculty computer literacy through increased availability of computer hardware and software, and corresponding support in the form of workshops, demonstrations, orientations, consultations and printed as well as computerized instructional materials. A Microcomputer Infusion Resource Facility (MIRF) was established, and together with University Computing Services offers a growing number of mini-courses on specific hardware and software, and maintains a substantial library of software products and documentation. Additionally, a series of instructional units on using the university's E-Mail system, as well as instruction in accessing and using the

University's computer networks are provided online, through the University broadband system.

Between the fall of 1983 and fall, 1988, ASU spent over $3.6 million in microcomputer infusion in an effort to place microcomputers and software in the hands of faculty. However, with the emphasis still on word processing, use of the University's electronic mail system, and basic computer file management, the long range goal of "bringing faculty to a level of computer comfort and confidence to freely incorporate the computer as a working tool in their preparation and presentation of instruction" (Bitter & Rossberg, 1988, p.26), still seems as distant as ever. Although the University Libraries' staff have been active in providing demonstrations and consultation in compact disk technology and fee-based database searching, these technologies, too, remain under-utilized by faculty in their teaching and research endeavors.

This scenario prepared the way for an innovative project to give faculty exposure to, and hands on experience with state-of-the-art educational technology in an environment that would be perceived as challenging rather than threatening, and would be relevant across the broad boundaries of diverse disciplines, research interests and teaching styles. This new experiment would not try to duplicate the already successful components of faculty computer literacy programs already in place at ASU--those dealing with popular and

widely used computer applications-- but would reach out with a broader mission to acquire and make available "the next generation of technologies with the potential as instructional media" (Gooler, 1989). The outcome of this forward-looking project to create a laboratory on campus where faculty members are encouraged to explore and experiment with the latest educational technologies, and challenged to incorporate them into their research and teaching, is the subject of part II of this paper.

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that the new technologies bring. Realizing full potential on the new technology will mean addressing these concerns with new training programs for faculty

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PART II

ALTEC: Implementing an Advanced Learning Technologies Laboratory for Faculty at Arizona State University

In the fall of 1986, University Media Systems, a department of University Libraries at Arizona State University, was instructed by the Vice President of Academic

Affairs to begin planning a state-of-the-art media demonstration room for faculty and staff. The project developed out of a concern that no facility existed on campus that provided faculty and staff an opportunity to explore and experiment with new technology.

While other departments and colleges on campus share the responsibility for supporting the use of microcomputers in education, these departments deal primarily with their own members, not with the university faculty as a whole. University Media Systems was charged to create an Advanced Learning Technologies Laboratory (ALTEC) to support educational media use and development on campus.[1]

The idea behind the ALTEC concept is to utilize *all* the tools available to transmit knowledge. Rapid advances in technology are providing educators with a vast array of technologocalproducts and opportunities to enhance instruction. ALTEC provides a place where faculty members can become familiar with these new technologies and gain insight and confidence in their use, with the hope that they will incorporate what they have learned into their daily instruction. ALTEC provides its users with opportunities to explore and experiment with the most advanced instructional technologies. The materials and equipment draw educators from all disciplines. The addition of a classroom in ALTEC provides a place to utilize new technologies in instructional contexts. Instructors may come

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1 UMS Planning Papers

into the lab area to preview, evaluate and become proficient with new educational technologies, and then incorporate this technology into their curriculum utilizing the ALTEC classroom. The ALTEC classroom also includes provision for the delivery of teletraining and distance education. It is also intended that the offerings of the Lab go beyond providing equipment and courseware demonstrations, to include related professional workshops directed to faculty members in a wide variety of areas.[2]

In planning ALTEC, the following five main goals were established: 1) to demonstrate new educational technologies; 2) to preview emerging educational hardware and software; 3) to provide consultation in the design and production of computer-based educational media; 4) to explore new applications of technology for instructional purposes and; 5)to provide a reference library on emerging educational technologies.[3] In developing a budget, a realistic estimate of 1.5 million dollars was proposed by University Media Systems to equip a fully functional state-of-the art media demonstration facility. Faced with university budget reductions, and the consequent prospect of a long wait for full funding, a second, scaled down proposal (less than $60,000), was put forward to begin

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2 Rowe, J., INTERVIEW, December 4, 1989
3 Herrington, S., INTERVIEW, November 30, 1989

developing a functional facility. With these funds, it was proposed, the lab could contain several stations, each dedicated to a different educational technology.[4]

One of the original charges to the ALTEC planning group was to identify a campus site for the facility. In selecting a site, five criteria were pursued: 1) that ALTEC be located in an academic unit; 2) provide space for a satellite downlink; 3) have "open space" which could be utilized in a flexible manner; 4) be centrally located on campus; and 5) have a classroom suitable for large group presentations.[5] A number of possible locations were considered throughout the campus. After examining all possible layouts and plans, an agreement was reached to house ALTEC in the College of Business' new Classroom Building. Prior association between the Business College and UMS' Instructional Television and Equipment Circulation Services made this an ideal location.[6] With the location decided upon, the ALTEC planning group then directed their effort toward selecting specific technologies to be housed in ALTEC. The consensus was to provide equipment that would support educational instruction through exploration and experimentation. Among the cutting edge technologies chosen to be showcased in ALTEC were the following:

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4 UMS Planning Papers
5 Herrington, S., INTERVIEW, November 30, 1989
6 Rowe, J., INTERVIEW, December 4, 1989

1) Laser Disc Technologies (this technology offers instructional flexibility in presentation medium with random access capability using video, still frame and multi-trac audio with and without user interaction; 2) 8mm Video (Its compact size has made it one of the most promising distribution medium for developing training and educational products; 3) VHS Hi Fi (improvement in these recorders are producing higher quality video images and audio tracs, while easy editing capabilities make it a popular presentation system); 4) Satellite reception (satellite technology will be discussed later in this paper); 5) Multi-image (multi-image systems permit the combination of still and motion images into an integrated presentation format). Recent developments in computer imaging, microprocessor control, and staging have dramatically increased the capabilities of this format, permiting combinations of images in ways that are much more economical than other video and computer technologies. Transfer to and distribution of video format makes multi-image systems a very practical presentation medium for instruction.[7]

Staffing was achieved by utilizing existing Media Systems personnel loaned or reassigned from various departments, based on their skills and experience. It was decided that one vacant UMS position would be reclassified and used to create the position of ALTEC manager . A secretary from UMS administration was assigned to ALTEC. The Head

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7 Gillespie, J., INTERVIEW, December 5, 1989

of UMS Development and Evaluation, who had been involved in the planning process from the beginning, was charged with the overall administrative responsibilities of ALTEC. It was also decided that four media specialists from the department would contribute one day a week, serving as consultants in residence.

With a lab, classroom, equipment and staff ALTEC opened its doors for business in the Spring of 1989.

Due to limited funding, it was decided that one of the keys to success would be ALTEC's ability to attract commercial suppliers of educational hardware and software to the facility. Such companies were encouraged to use the media demonstration facility to showcase their new products. In many cases, state-of-the-art hardware and software exist only in prototype form. It is believed that ALTEC offers an ideal test site for these "cutting edge" developments in instructional technology. A successful vendor program would also keep capital investment low while providing the academic community with access to the latest and best educational technology.[8] It is the opinion of all associated with ALTEC that satellite transmission is the educational distribution medium of the future. Therefore, while ALTEC was still in the development stage, satellite reception capabilities were considered an essential component . Vast amounts of instructional

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8 Rowe, J., INTERVIEW, December 4, 1989

materials are available via satellite to enhance and support instructional efforts. Reception of C and KU band transmissions demonstrate the capabilities of satellite distribution, and guides to programming information permit instructors to preview a wide variety of programs available for potential classroom use.[9] This capability has allowed the classroom to host numerous video conferences and to serve as a downlink center. The classroom is also a showcase for the National Technological University, of which UMS is a member. Here, ASU faculty members can view the University's ITFS programs, and the TIE-IN network.

Satellite downlink provides an excellent way to generate instructional materials; by selectively purchasing satellite teleconferences and transferring them to video tape, ALTEC can make these materials available to the faculty at their convenience.

Also planned for the near future is audio conferencing between Arizona State University's main campus and its new branch campus over 20 miles away. ALTEC plans to host classes, seminars and business meetings which can be attended by members of both campus' via audio conferencing. The success of this project hopefully will lead to establishing ALTEC as a permanent video conferencing site linking the two campus and

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9 Herrington, S., INTERVIEW, November 30, 1989

other institutions.[10] In addition to teleconferencing capabilities, a significant investment of money and energy has gone into acquiring three CD-ROM and interactive video workstations. Interactive video has the potential to fill the role formerly held by on-site teachers. With the acquisition of this technology, ALTEC hopes to design, produce and implement interactive video programs with and for the faculty.[11] While ALTEC is still in an experimental period it is hoped that it will a become fully funded part of University Media Systems. Success depends on a number of criteria. First, ALTEC must become a facility that faculty identify with instruction and technology. It is critical that ALTEC be widely and extensively used by those that it is charged to serve. It is also hoped that for educators outside the university ALTEC will become a model center for applying learning theory to instruction and for utilizing state-of-the art technology.

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10 Rowe, J., INTERVIEW, December 4, 1989
11 Gillespie, J., INTERVIEW, December 5, 1989